107313
ORIGINAL
(Red)

WESTON • SPER Suite 3, 5090 Central Highway, Pennsauken, NJ 08109 • (609) 663-7995

TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE REMOVAL AND PREVENTION
EPA CONTRACT 68-01-6669

MEMORANDUM

TO: Jay Rodstein, OSC, EPA Region III PCS #5324

THRU: Steve Jarvela, DPO, EPA Region III

THRU: Rich Habrukowich, TATL, Region III RH for RH

FROM: Greg Janiec, ATATL, Region III GJ
Peter Harnett, TATM, Region III PH

SUBJECT: Dublin TCE Site

DATE: September 15, 1986

BACKGROUND

During a routine drinking water survey, the Bucks County Health Department discovered elevated levels of trichloroethene (TCE) in tap water samples obtained from the Dublin Borough area (see the water summary attached). The borough water supply primarily consists of private and public wells. Elevated TCE levels (greater than 5 ppb) have been located in approximately 170 homes, apartments and businesses affecting approximately 500 residents. It is worth noting that Whistlewood Apartments has 144 units. As such, many of the estimated 500 affected residents live here.

The Bucks County Health Department has issued advisories to the public regarding water usage in which they recommended installation of a carbon filter system for levels of TCE above 5 ppb. For levels above 500 ppb of TCE, they cautioned residents not to bathe with this water.

The EPA Region III Emergency Response Section received the Bucks County Health Department data for evaluation on September 3, 1986. The OSC and his technical staff determined the current water usage status of all residential and public wells which were determined to have elevated levels of TCE. A meeting between EPA, Roy F. WESTON Technical Assistance Team (TAT), and Bucks County Health Department was held on September 12, 1986 to obtain additional information in order to develop a coordinated approach by the respective agencies.

Following this meeting, a site tour was conducted to make observations to locate the source of the TCE contamination. Additional information was obtained locally at the Dublin Borough Office which is located at 119 Maple Avenue. The following is a listing of contacts concerning this project.

Dublin Borough	Hon. John Colflesh	(215) 249-9040
Borough Manager	Luther Wonsidler	(215) 249-3310
Bucks County Health Department	Pete Noll	(215) 345-3327
EPA Emergency Response Section	Jay Rodstein	(215) 597-3152
Roy F. WESTON - TAT	Greg Janiec, Peter Harnett	(609) 663-7995

LOCATION

Dublin Borough is located in northern Bucks County approximately 25 miles north of Philadelphia, PA (see location map attached). The Borough is bordered by Bedminster Township to the east and Hilltown Township to the west.

POPULATION

Dublin Borough estimates (1986) there are 1,800 people living in the Borough.

WATER AVAILABILITY

The physical characteristics of the Lockatong (dense rock) and Brunswick (overlapping shale) geologic formations limit the rate of groundwater recharge.[1] The recharge rate for the Dublin Borough is about 190,000 gallons per day.[2] Assuming an average daily demand of 100 gallons per person, the daily demand is approximately equal to the recharge rate.

According to Township historical drilling records, a perched water table may be intercepted as shallow as five feet beneath the surface. The more recently drilled, higher-yield wells exceed 300 feet in depth. Both shallow and deep wells appear to be contaminated with TCE. At this time, the average well is believed to be cased to approximately 30 feet.

1. Dublin Borough Comprehensive Plan, (September 1985) p. 18.

2. Dublin Borough Comprehensive Plan, (September 1985) p. 19.

The Dublin Borough Comprehensive Plan is available from the Dublin Borough Office. It is located at 119 Maple Avenue in Dublin, Pennsylvania.

GJ/PH:lal

Attachments

DUBLIN TCE SITE INFORMATION SHEET
BUCKS COUNTY, PENNSYLVANIA

Trichloroethene (TCE)

Synonym:	Trichloroethylene
Common Uses:	Solvent used in degreasing, pharmaceutical, veterinary, disinfectant, dry cleaning, refrigerant and heat-exchange liquid, organic synthesis, fumigant.
Properties:	Colorless, chloroform odor in air, specific gravity = 1.45 (heavier than water), solubility @ 25°C = 1100 ppm (dissolves in water).
Health Effects:	A suspect carcinogen; 2.7 ppb (parts per billion) is believed to represent an increased lifetime cancer risk of one in one million. Ten-Day Health Advisory = 200 ppb. Proposed MCL (Maximum Concentration Limit) = 5 ppb. Recommended Drinking Water Limit = 0 ppb.
Removal Methods: (from water)	1. Carbon filtration - TCE adsorbs to charcoal. 2. Air stripping - TCE can be vaporized through a water aeration system and vented to the ambient air where the compound naturally decomposes.

STATE AND COUNTY ACTIONS TO DATE

1. Sixty-one (61) tap water samples have been analyzed to date. The TCE concentrations at the tap include: 25 samples with non-detectable levels of TCE; 12 samples with levels between 0 and 5 ppb; 12 samples with levels between 5 and 200 ppb; 11 samples with levels greater than 200 ppb, and one (1) sample which has TCE present, but the level has not been made available.

2. Thirty-seven (37) of the samples were taken by Pennsylvania Department of Environmental Resources personnel for analysis by the State. Twenty-four (24) were taken by private laboratories per the request of the homeowner.

3. For State water samples, the resident or business owner was first contacted by phone and later with a copy of the laboratory results along with a recommendation to use a charcoal treatment system should the level be at or above 5 ppb. At levels between 5 and 75 ppb charcoal treatment, boiling of water, and purchase of bottled water were suggested by phone; however, only charcoal treatment was suggested in follow-up letters.

DUBLIN TCE SITE
BUCKS COUNTY, PA
TAP WATER SUMMARY SHEET

NAME	ADDRESS	WELL DEPTH, FEET	DATE	LAB	WATER USAGE	TCE	PCE	1,1,1-TCE
MOYER FLOWER SHOP	138 N MAIN ST	280	08/04/86	DER	BW	50	ND	ND
MYERS	126 N MAIN ST	NA	07/02/86	DER	BW	350	ND	ND
MOYER	152 ELEPHANT RD	225	08/04/86	DER	BW,SW	150	ND	ND
DUBLIN FAST TAG & NOTARY	105 N MAIN ST	NA	08/05/86	DER	CT	27	2.0	ND
SCHMELL	149 N MAIN ST	NA	07/15/86	QC	CT	105	ND	ND
DUBLIN DINER	N MAIN ST	NA	06/26/86	QC	CT	58.9	ND	2.3
PASQUA	111 CHERRY LA	85	06/23/86	DER	NP	ND	ND	ND
SILEYMAKER	114 ELEPHANT RD	NA	07/01/86	PL	NP	ND	ND	ND
DUBLIN VILLAGE PLAZA	161 N MAIN ST	NA	07/02/86	QC	NP	ND	ND	ND
BINSBERGER	148 MAPLE AVE	130	06/26/86	DER	NP	ND	ND	ND
SUPPLEE	105 CHERRY LA	200	06/26/86	DER	NP	ND	ND	ND
FRED BRITTON	3212 RICKERT RD	NA	07/07/86	QC	NP	ND	ND	ND
MARK FRANKLIN WELL #2	104 MIDDLE RD	22	09/09/86	DER	NP	ND	ND	ND
ROBERT OTT	105 MIDDLE RD	NA	07/15/86	PS	NP	2.1	ND	ND
DAIRY QUEEN	N MAIN ST, MILL ST.	NA	06/26/86	DER	NP	1.0	ND	ND
DUBLIN INN	101 S MAIN ST	>90	09/09/86	DER	NP	ND	ND	ND
BOROUGH HALL	MAPLE AVE	NA	06/26/86	QC	NP	ND	ND	ND
DUBLIN ACRES WELL #1	RICKERTS RD	NA	06/25/86	PS	NP	3.2	ND	ND
PA. STATE POLICE	RICKERTS RD	>560	06/26/86	DER	NP	ND	ND	ND
MRS CLARENCE MYERS	120 CHERRY LA	NA	06/26/86	QC	NP	ND	ND	ND

DUBLIN TCE SITE
BUCKS COUNTY, PA
TAP WATER SUMMARY SHEET

NAME	ADDRESS	WELL DEPTH, FEET	DATE	LAB	WATER USAGE	TCE	PCE	1,1,1-TCE
RUSH	152 ELEPHANT RD	400	/ /	DER	NP	1.0	ND	ND
ALLEN	115 CHERRY ST	130	08/05/86	DER	NP	ND	ND	ND
DUBLIN VILLAGE APTS.	CHERRY LA	NA	06/23/86	PS	NP	ND	ND	ND
WOODS EDGE APARTMENTS	126 MIDDLE RD APT #D2	NA	06/27/86	QC	NP	ND	ND	ND
DUBLIN FIRE COMPANY	194 N MAIN ST	100	07/15/86	DER	NP	2.5	ND	ND
MOYER AUTO BODY	130 N MAIN ST	140	06/23/86	QC	NP	ND	ND	ND
GRACE	115 ELEPHANT RD.	NA	06/26/86	QC	NP	ND	ND	ND
KULP	MAPLE AVE	NA	06/26/86	QC	NP	ND	ND	ND
RHINES GULF	112 N MAIN ST	NA	07/02/86	DER	NP	4.5	ND	ND
WOODS EDGE APARTMENTS	126 MIDDLE RD APT #A2	NA	06/27/86	QC	NP	ND	ND	ND
HANSEL	116 N MAIN ST	NA	07/02/86	DER	NP	2.2	ND	ND
GARY MOYER	CHERRY ST	NA	06/23/86	QC	NP	ND	ND	ND
SILEYMAKER	163 N MAIN ST	NA	07/01/86	PL	NP	ND	ND	ND
STILLINGA	120 MAPLE AVE	NA	08/05/86	DER	NP	ND	ND	ND
DUBLIN ACRES WELL #2	RICKERTS RD	NA	06/25/86	PS	NP	ND	ND	ND
MARK FRANKLIN WELL #1	104 MIDDLE RD	315	09/09/86	DER	NP	ND	ND	ND
DUDLEY SPORTS OFFICE	112 MAPLE AVE	NA	06/26/86	DER	NP	ND	ND	2.0
FIRST FEDERAL BANK	142 N MAIN ST	300	07/02/86	DER	NP	1.0	ND	ND
HARRIS	215 FRONTIER RD	100	08/04/86	DER	NP	1.0	ND	ND
MERRILL MEYERS	139 ELEPHANT RD	245	09/09/86	DER	NP	1.3	ND	2.7

DUBLIN TCE SITE
BUCKS COUNTY, PA
TAP WATER SUMMARY SHEET

NAME	ADDRESS	WELL DEPTH, FEET	DATE	LAB	WATER USAGE	TCE	PCE	1,1,1-TCE
BUNTING	170 N MAIN ST	NA	08/04/86	DER	NP	3.7	ND	ND
IRMA DETWEILER	150 ELEPHANT RD	290	09/09/86	DER	NP	2.0	ND	ND
DOYLESTOWN FED S & L	174 N MAIN ST	NA	06/23/86	DER	NT	7.8	ND	ND
BLACK	116 ELEPHANT RD	NA	08/05/86	DER	NT	5.6	ND	ND
DUBLIN GARAGE	139 N MAIN ST	300	08/04/86	DER	SW	17	ND	ND
BARBARA FLUCK	128 N MAIN ST	NA	07/15/86	QC	SW	217	ND	ND
THOMPSON PLANT WELL #2	120 MILL ST	80	06/23/86	DER	SW	100	ND	2
THOMPSON PLANT WELL #1	120 MILL ST	80	06/23/86	DER	SW	5000	8.6	27
EMICO INC WELL #1	123 N MAIN ST	300	06/23/86	DER	SW	360	1.0	3.8
BOYLE	115 N MAIN ST	NA	08/05/86	DER	SW	40	ND	ND
ROBERT RUFE	122 N MAIN ST	250	07/02/86	DER	SW	250	ND	ND
BUCKS COUNTY BANK	CHERRY LA	NA	06/26/86	QC	SW	242	ND	ND
THOMPSON PLANT WELL #1	120 MILL ST	80	07/15/86	DER	SW	10000	ND	25
EMICO INC WELL #2	123 N MAIN ST	300	06/23/86	DER	SW	500	ND	5.9
TERRY HINSDALE	113 N MAIN ST	NA	07/15/86	AP	SW	9.4	ND	ND
FARM BUREAU	104 MILL ST	300	06/26/86	DER	SW*	1000	1.4	6.0
WHISTLEWOOD APTS	APT #107 N. MAIN	300	06/17/86	DER	SW, AS	500	ND	ND
WHISTLEWOOD APTS	APT # 107 N. MAIN	300	06/11/86	DER	SW,AS	420	ND	3
DETWEILER	153 N MAIN ST	NA	07/15/86	PL	UC	*	ND	ND
BUCHANAN	117 N MAIN ST	NA	07/15/86	PL	UC	15	ND	ND

DUBLIN TCE SITE
BUCKS COUNTY, PA
TAP WATER SUMMARY SHEET

NAME	ADDRESS	WELL DEPTH, FEET	DATE	LAB	WATER USAGE	TCE	PCE	1,1,1-TCE
HIRST	119 N MAIN ST	NA	07/11/86	PL	UC	19.3	1.0	ND

All levels are in parts per billion (ppb) for each compound listed above.

* SW - Mr. Scott Tyson of the Farm Bureau did mention that employees wash with water from tap. Note: This level is greater than 500 ppb level of TCE, which County recommended no washing with water.

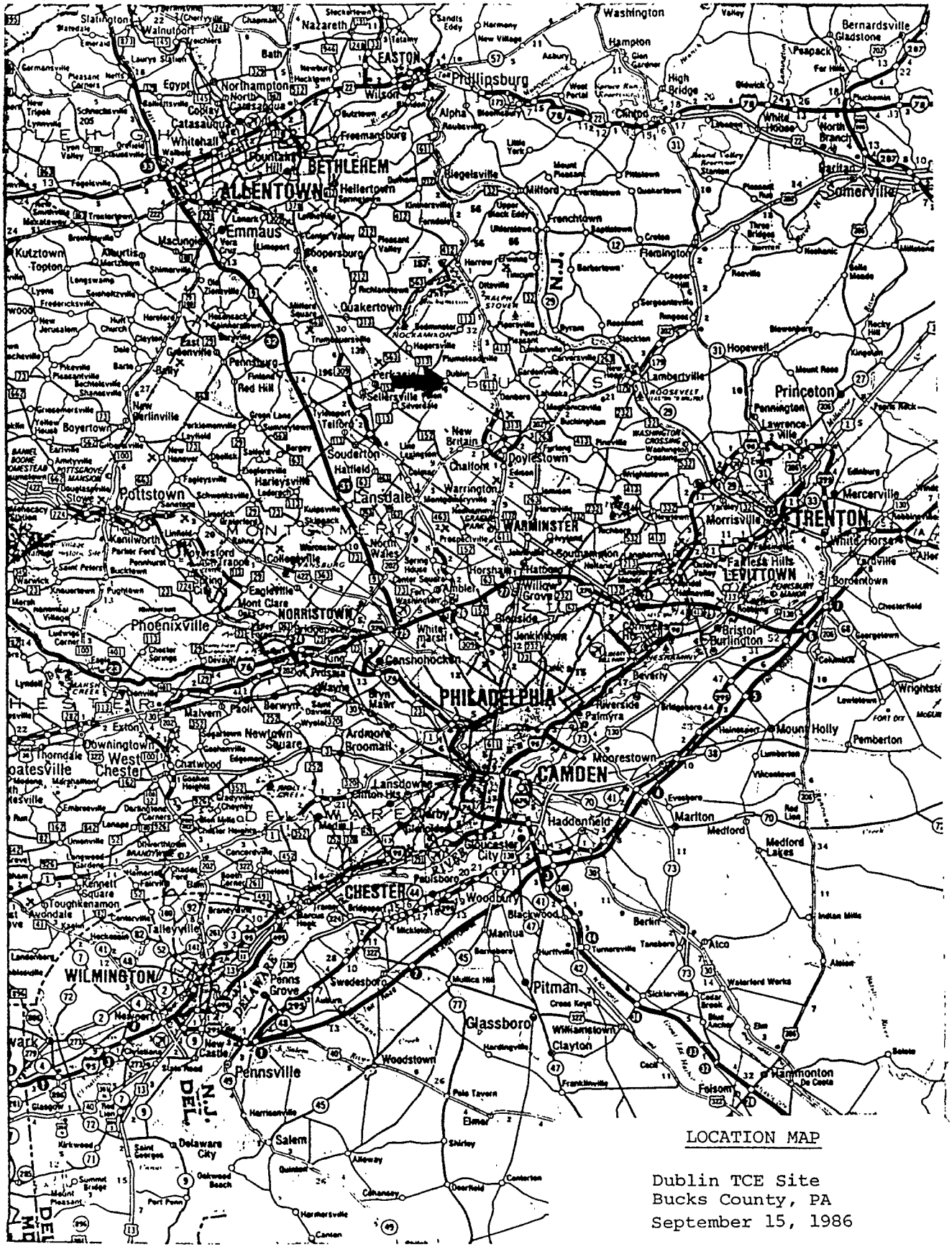
** Mrs. Detweiler had a private laboratory do analysis but chose not to give TCE level to County.

Water Usage Abbreviations

SW Supplied water is used for drinking (purchased, supplied).
AS Air stripper is in operation.
NP Non-problematic level of TCE.
NT No treatment, water is used for drinking.
CT Charcoal treatment system is in operation.
BW Water is boiled before drinking.
UC Unable to contact party.

Other Abbreviations

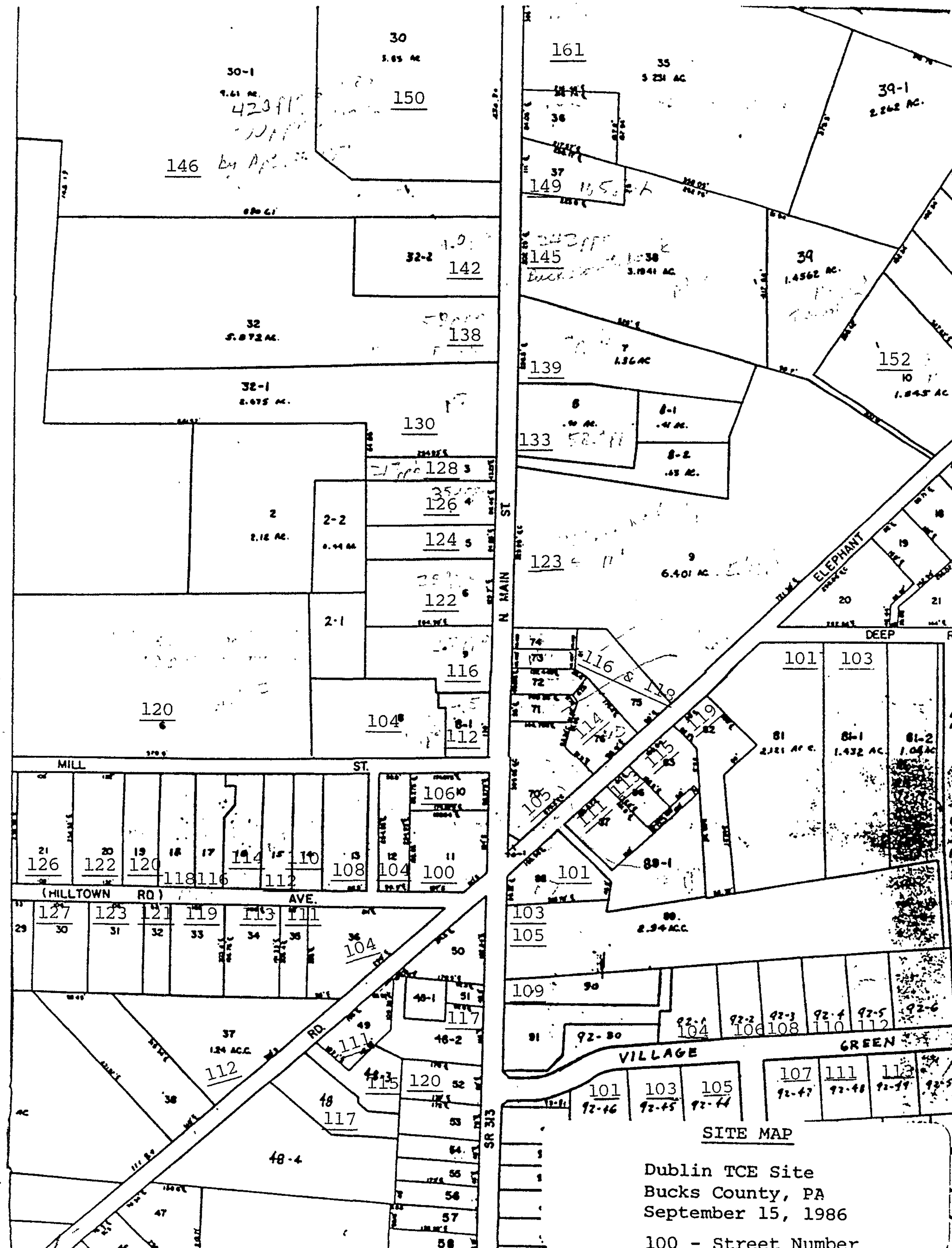
ppb Parts per billion.
ND Non-detectable level.
DER Pennsylvania Department of Environmental Resources Laboratory.
QC Quality Control Laboratory.
PS Purity Standard Laboratory.
AP Aqua Pure Laboratory.
PL Private laboratory, resident did not supply name of laboratory.



LOCATION MAP

Dublin TCE Site
Bucks County, PA
September 15, 1986

AR400042



SITE MAP

Dublin TCE Site
Bucks County, PA
September 15, 1986

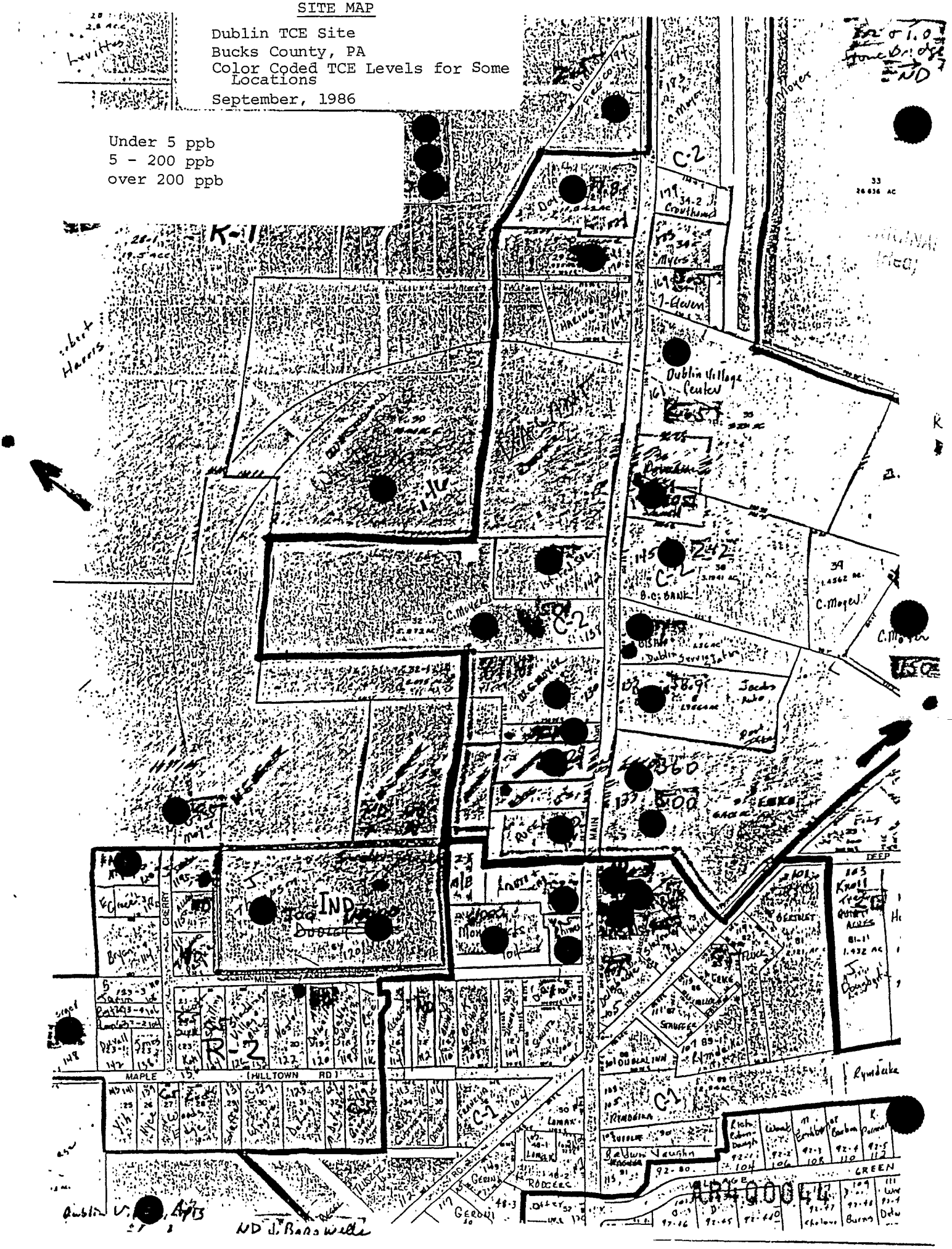
100 - Street Number

AR400043

SITE MAP

Dublin TCE Site
Bucks County, PA
Color Coded TCE Levels for Some Locations
September, 1986

Under 5 ppb
5 - 200 ppb
over 200 ppb



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APPENDIX IV

ORIGINAL
(Red)

GROUNDWATER MONITORING WELL GUIDELINES

Dublin TCE Site
Dublin, Bucks County, PA

Scope

The purpose of this proposed groundwater monitoring system is to identify and quantify TCE contamination at the Dublin TCE Site. This document provides the construction and material specifications to govern the construction of all groundwater monitoring wells associated with the Dublin TCE Site.

Well Specifications

The following specifications and descriptions shall be adhered to in the construction of all groundwater monitoring wells installed as related to the Dublin TCE Site in Dublin, Bucks County, Pennsylvania. The wells must allow for the collection of a sample representative of the groundwater flow in its area.

All monitoring wells will be drilled in the presence of a representative of the Pennsylvania Department of Environmental Resources. Any changes in these procedures must be cleared through the Emergency Response Division of EPA, Region III.

a) Protective casing - this outer casing shall be new steel line pipe extending a minimum of 8 feet. This protective casing shall be six inches (6") in diameter.

b) Well casing - the well casing shall be new PVC piping with an inside diameter of four inches (4"). Only flush threaded coupling shall be used. No glues or adhesives will be used in the well construction.

c) Screening - screening shall consist of new factory constructed PVC with 0.050-inch openings.

d) Packing material - this material shall consist of clean, washed and uniform grains such that 85% can pass through a 1/2-inch sieve and <15% can pass through a 0.187-inch sieve. No crushed limestone or dolomite shall be used.

e) Grout - this material shall be a mixture of cement (94 lbs.) to not more than 6 gallons of water.

f) Well collar - shall be constructed of cement concrete as an antipercolation device.

Well Construction

Wells shall be drilled to allow the placement of the six-inch (6") protective casing. This casing shall extend one foot above ground level and 7 feet below the ground level. A protective cap will be installed, constructed of metal which can be secured with a security lock. The remainder of the well shall be drilled to allow for the placement of the four-inch (4") PVC casing. Well casing shall continue through solid rock unless specified by EPA or State representative.

Groundwater Monitoring Well Guidelines
Dublin TCE Site, Bucks County, PA.

Well Construction (continued)

Splitspoon sampling will be performed at 24-inch intervals. The EPA or State representative will indicate the depth to terminate each well based on observations of the splitspoon sampling. The contractor shall not drill more than 75 feet without written permission from the Emergency Response Division of EPA Region III. Well screening will be installed ten feet (10') below the existing groundwater level and to the level of the seasonal high water level or as specified by the EPA or State representative.

All void space between the screening and the hole wall shall be filled with the specified packing material to a level of one foot above the well screen. The remainder of the void space from the top of the packing material to well collar shall be filled with grouting material.

A well collar shall be installed around each well from the surface to a depth of three feet (3'). This structure is to force rainfall and surface runoff away from the well casing. The outer edges should be smooth and parallel to the well casing to prevent movement from frost heave.

During and after well drilling operations, the contractor shall guard against contaminating the well with any foreign materials or compounds. Any contamination due to neglect will be repaired at the contractor's expense.

Monitoring Procedures

The drilling contractor or his representative shall keep a hardbound drilling log of all holes drilled at Dublin TCE Site. Detailed notes of soil structure and water flow will be recorded. This log may be inspected by the EPA or State representative at any time during the drilling process. At the termination of the well installation project, the drilling log shall be relinquished to the EPA representative.

ATTACHMENT D

WESTON•SPER Suite 3, 5090 Central Highway, Pennsauken, NJ 08109 • (609) 663-7995

TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE REMOVAL AND PREVENTION
EPA CONTRACT 68-01-6669

DUBLIN TCE
SCOPE OF WORK
9/18/86

Introduction

As requested by the EPA Emergency Resonse Section, the Roy F. WESTON, Inc., Technical Assistance Team has developed the following scope of work to identify the source, extent of contamination and clean-up techniques as associated with the TCE contamination of groundwater in Dublin, Bucks County, PA.

Background

Dublin Borough is located in northern Bucks County approximately 25 miles north of Philadelphia, PA (see location map attached). The Borough is bordered by Bedminster Township to the east and Hilltown Township to the west. There are presently an estimated 1,800 people living in the Dublin Borough.

During a routine drinking water survey, the Bucks County Health Department discovered elevated levels of trichloroethene (TCE) in tap water samples obtained from the Dublin Borough area (see Appendix 1). The borough water supply primarily consists of private and public wells. Elevated TCE levels (greater than 5 ppb) have been located in approximately 170 homes, apartments and businesses affecting approximately 500 residents. It is worth noting that Whistlewood Apartments has 144 units. As such, many of the estimated 500 affected residents live here.

The Bucks County Health Department has issued advisories to the public regarding water usage in which they recommended installation of a carbon filter system for levels of TCE above 5 ppb. For levels above 500 ppb of TCE, they cautioned residents not to bathe with this water.

The EPA Region III Emergency Response Section received the Bucks County Health Department data for evaluation on September 3, 1986. The OSC and his technical staff determined the current water usage status of all residential and public wells which were determined to have elevated levels of TCE. A meeting between EPA, Roy F. WESTON, Inc., Technical Assistance Team (TAT), and Bucks County Health Department was held on September 12, 1986, to obtain additional information in order to develop a coordinated approach by the respective agencies.

This scope of work has been divided into three distinct phases. Phase I will attempt to identify the source of the TCE contamination in the borough of Dublin. Currently, the suspected source is a small industrial facility located at 120 Mill Street (see Appendix 2). The associated well has been found to contain TCE levels of 10,000 ppb which represents the highest level of contamination discovered in the borough to date. A County Health Department investigation has documented TCE usage during previous ownership of the property.

To further determine the source of contamination, it is proposed that the TAT and EPA Environmental Response TEAM (ERT) will perform an investigation focused on 120 Mill Street using soil gas techniques outlined in Appendix 3. Soil gas loci determination will be formulated both in response to surface conditions and accumulated data. A concurrent information search will be conducted by EPA and TAT personnel to better define alternate potential sources and responsible parties. Phase I is to be completed in ten days from the official start-up.

Phase II will attempt to define the extent of contamination. Based on the soil gas data from Phase I, monitoring wells or test pits will be installed to determine the dimensions of any contaminant plume. The monitoring well placement will be based on hydrogeologic data and technical input from the County Health Department, PADER and EPA personnel. These monitoring wells will be developed according to the guidelines outlined in Appendix 4 to facilitate their possible use during a possible recovery project. Phase II will be completed in 21 days following the conclusion of Phase I operations.,

Phase III will consist of the installation of a water treatment system and/or the removal/treatment of any source of TCE contamination. The methodology employed will be formulated based on the data collected during Phase I and Phase II operations. At the present time air stripping, excavation and microbial treatment are being considered as possible clean-up strategies.

APPENDIX I

DUBLIN TCE SITE
BUCKS COUNTY, PA
TAP WATER SUMMARY SHEET

NAME	ADDRESS	WELL DEPTH, FEET	DATE	LAB	WATER USAGE	TCE	PCE	1,1,1-TCE
HOYER FLOWER SHOP	138 N MAIN ST	280	08/04/86	DER	BW	50	ND	ND
MYERS	126 N MAIN ST	NA	07/02/86	DER	BW	350	ND	ND
HOYER	152 ELEPHANT RD	225	08/04/86	DER	BW,SW	150	ND	ND
DUBLIN FAST TAG & NOTARY	105 N MAIN ST	NA	08/05/86	DER	CT	27	2.0	ND
SCHMELL	149 N MAIN ST	NA	07/15/86	QC	CT	105	ND	ND
DUBLIN DINER	N MAIN ST	NA	06/26/86	QC	CT	58.9	ND	2.3
PASQUA	111 CHERRY LA	85	06/23/86	DER	NP	ND	ND	ND
SILEYMAKER	114 ELEPHANT RD	NA	07/01/86	PL	NP	ND	ND	ND
DUBLIN VILLAGE PLAZA	161 N MAIN ST	NA	07/02/86	QC	NP	ND	ND	ND
BINSBERGER	148 MAPLE AVE	130	06/26/86	DER	NP	ND	ND	ND
SUPPLEE	105 CHERRY LA	200	06/26/86	DER	NP	ND	ND	ND
FRED BRITTON	3212 RICKERT RD	NA	07/07/86	QC	NP	ND	ND	ND
MARK FRANKLIN WELL #2	104 MIDDLE RD	22	09/09/86	DER	NP	ND	ND	ND
ROBERT OTT	105 MIDDLE RD	NA	07/15/86	PS	NP	2.1	ND	ND
DAIRY QUEEN	N MAIN ST, MILL ST.	NA	06/26/86	DER	NP	1.0	ND	ND
DUBLIN INN	101 S MAIN ST	>90	09/09/86	DER	NP	ND	ND	ND
BOROUGH HALL	MAPLE AVE	NA	06/26/86	QC	NP	ND	ND	ND
DUBLIN ACRES WELL #1	RICKERTS RD	NA	06/25/86	PS	NP	3.2	ND	ND
PA. STATE POLICE	RICKERTS RD	>560	06/26/86	DER	NP	ND	ND	ND
MRS CLARENCE MYERS	120 CHERRY LA	NA	06/26/86	QC	NP	ND	ND	ND

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TAP WATER SUMMARY SHEET

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ALLEN	115 CHERRY ST	130	08/05/86	DER	NP	ND	ND	ND
DUBLIN VILLAGE APTS.	CHERRY LA	NA	06/23/86	PS	NP	ND	ND	ND
WOODS EDGE APARTMENTS	126 MIDDLE RD APT #D2	NA	06/27/86	QC	NP	ND	ND	ND
DUBLIN FIRE COMPANY	194 N MAIN ST	100	07/15/36	DER	NP	2.5	ND	ND
MOYER AUTO BODY	130 N MAIN ST	140	06/23/86	QC	NP	ND	ND	ND
GRACE	115 ELEPHANT RD.	NA	06/26/86	QC	NP	ND	ND	ND
KULP	MAPLE AVE	NA	06/26/86	QC	NP	ND	ND	ND
RHINES GULF	112 N MAIN ST	NA	07/02/86	DER	NP	4.5	ND	ND
WOODS EDGE APARTMENTS	126 MIDDLE RD APT #A2	NA	06/27/86	QC	NP	ND	ND	ND
HANSEL	116 N MAIN ST	NA	07/02/86	DER	NP	2.2	ND	ND
GARY MOYER	CHERRY ST	NA	06/23/86	QC	NP	ND	ND	ND
SILEYMAKER	163 N MAIN ST	NA	07/01/86	PL	NP	ND	ND	ND
STILLINGA	120 MAPLE AVE	NA	08/05/86	DER	NP	ND	ND	ND
DUBLIN ACRES WELL #2	RICKERTS RD	NA	06/25/86	PS	NP	ND	ND	ND
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IRMA DETWEILER	150 ELEPHANT RD	290	09/09/86	DER	NP	2.0	ND	ND
DOYLESTOWN FED S & L	174 N MAIN ST	NA	06/23/86	DER	NT	7.8	ND	ND
BLACK	116 ELEPHANT RD	NA	08/05/86	DER	NT	5.6	ND	ND
DUBLIN GARAGE	139 N MAIN ST	300	09/04/86	DER	SW	17	ND	ND
BARBARA FLUCK	128 N MAIN ST	NA	07/15/86	QC	SW	217	ND	ND
THOMPSON PLANT WELL #2	120 MILL ST	80	06/23/86	DER	SW	100	ND	2
THOMPSON PLANT WELL #1	120 MILL ST	80	06/23/86	DER	SW	5000	8.6	27
EMICO INC WELL #1	123 N MAIN ST	300	06/23/86	DER	SW	360	1.0	3.8
BOYLE	115 N MAIN ST	NA	08/05/86	DER	SW	40	ND	ND
ROBERT RUFE	122 N MAIN ST	250	07/02/86	DER	SW	250	ND	ND
BUCKS COUNTY BANK	CHERRY LA	NA	06/26/86	QC	SW	242	ND	ND
THOMPSON PLANT WELL #1	120 MILL ST	80	07/15/86	DER	SW	10000	ND	25
EMICO INC WELL #2	123 N MAIN ST	300	06/23/86	DER	SW	500	ND	5.9
TERRY HINSDALE	113 N MAIN ST	NA	07/15/86	AP	SW	9.4	ND	ND
FARM BUREAU	104 MILL ST	300	06/26/86	DER	SW*	1000	1.4	6.0
WHISTLEWOOD APTS	APT #107 N. MAIN	300	06/17/86	DER	SW, AS	500	ND	ND
WHISTLEWOOD APTS	APT # 107 N. MAIN	300	06/11/86	DER	SW,AS	420	ND	3
DETWEILER	153 N MAIN ST	NA	07/15/86	PL	UC	*	ND	ND
BUCHANAN	117 N MAIN ST	NA	07/15/86	PL	UC	15	ND	ND

DUBLIN TCE SITE
BUCKS COUNTY, PA
TAP WATER SUMMARY SHEET

NAME	ADDRESS	WELL DEPTH, FEET	DATE	LAB	WATER USAGE	TCE	PCE	1,1,1-TCE
HIRST	119 N MAIN ST	NA	07/11/86	PL	UC	19.3	1.0	ND

All levels are in parts per billion (ppb) for each compound listed above.

* SW - Mr. Scott Tyson of the Farm Bureau did mention that employees wash with water from tap. Note: This level is greater than 500 ppb level of TCE, which County recommended no washing with water.

** Mrs. Detweiler had a private laboratory do analysis but chose not to give TCE level to County.

Water Usage Abbreviations

SW Supplied water is used for drinking (purchased, supplied).
AS Air stripper is in operation.
NP Non-problematic level of TCE.
NT No treatment, water is used for drinking.
CT Charcoal treatment system is in operation.
BW Water is boiled before drinking.
UC Unable to contact party.

Other Abbreviations

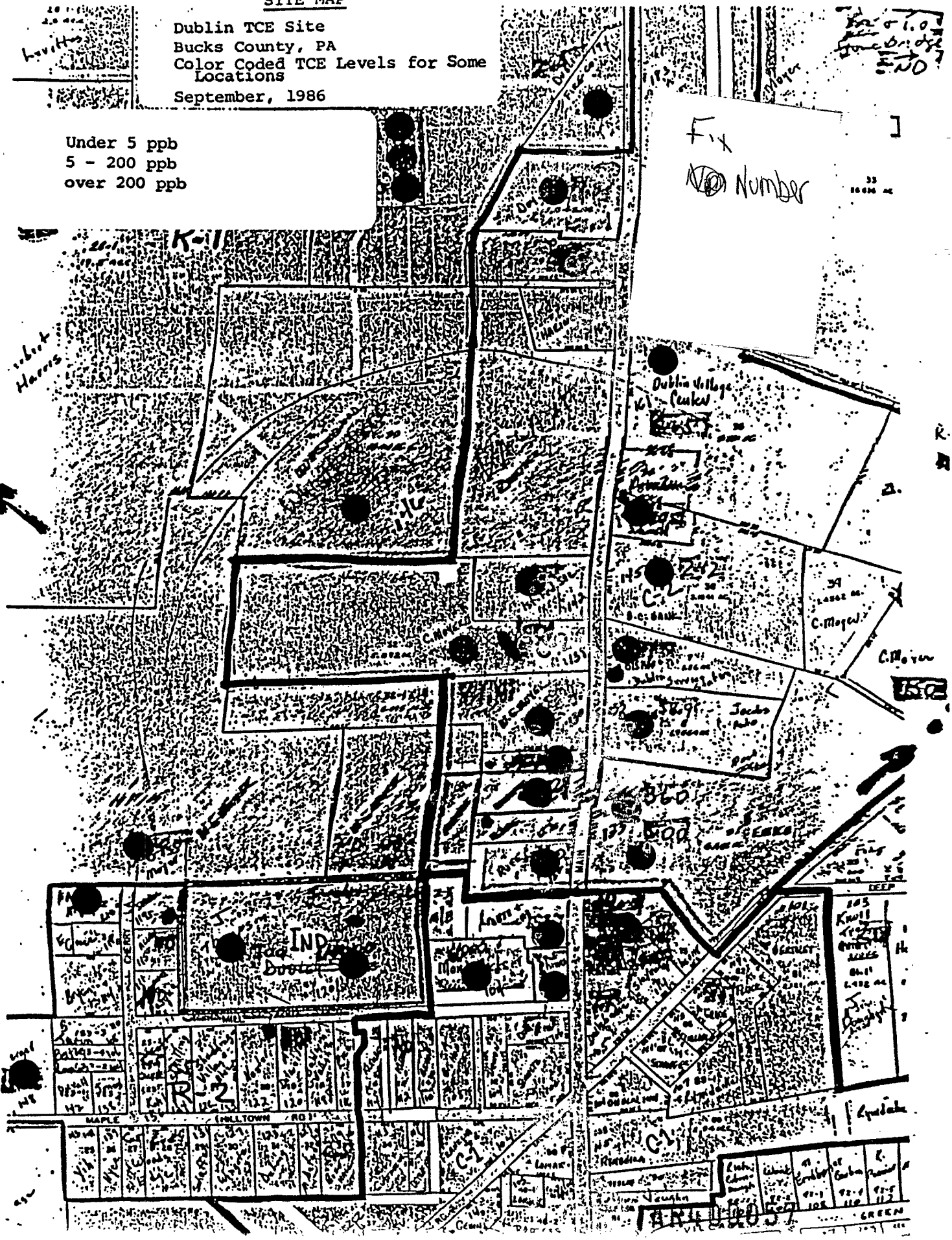
ppb Parts per billion.
ND Non-detectable level.
DER Pennsylvania Department of Environmental Resources Laboratory.
QC Quality Control Laboratory.
PS Purity Standard Laboratory.
AP Aqua Pure Laboratory.
PL Private laboratory, resident did not supply name of laboratory.

APPENDIX II

SITE MAP

Dublin TCE Site
Bucks County, PA
Color Coded TCE Levels for Some Locations
September, 1986

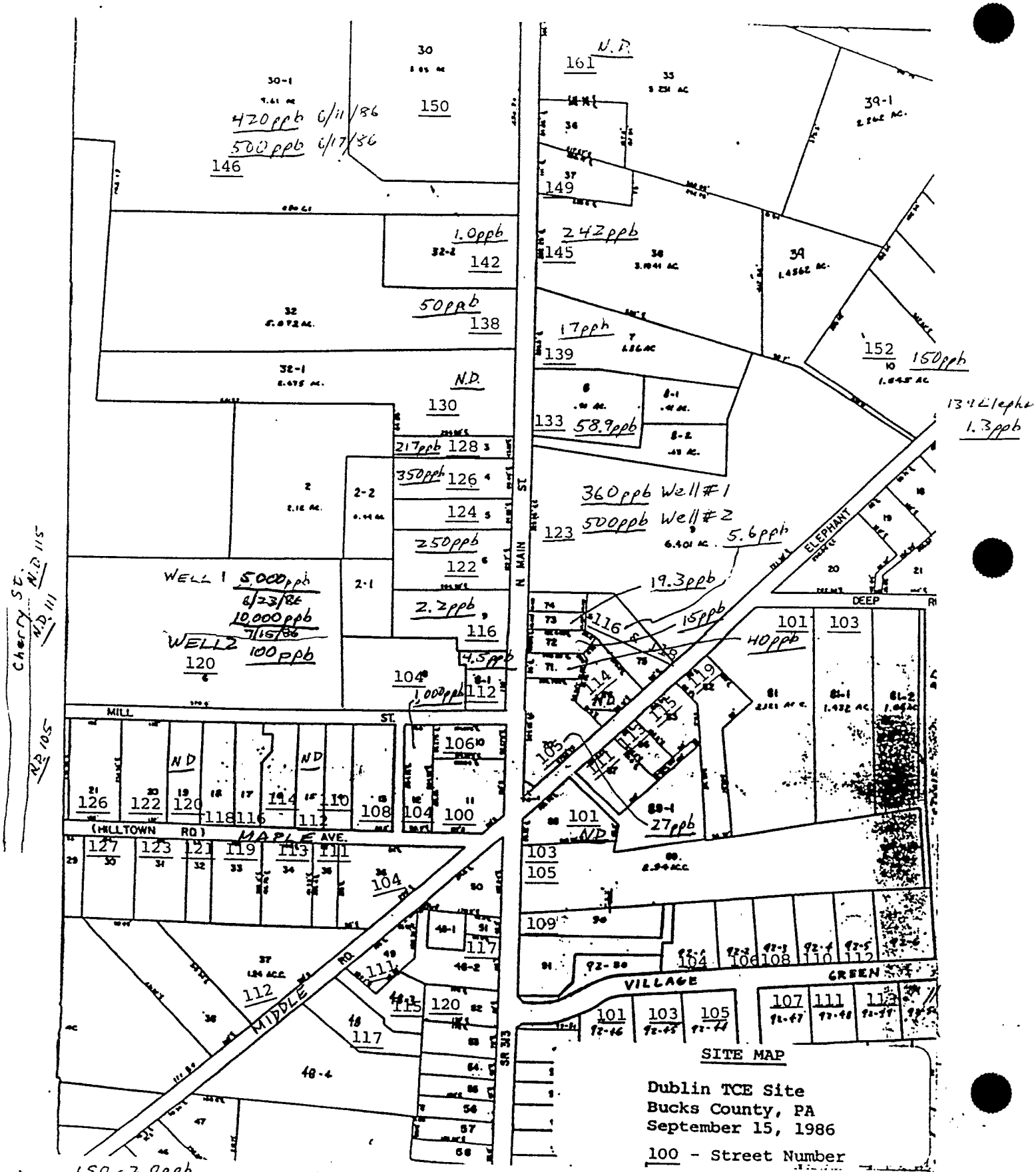
Under 5 ppb
5 - 200 ppb
over 200 ppb



(TCE levels are underlined)

2.5ppb 174 N Main
7.8ppb 174 N Main
3.7ppb 170 N. Main

ATTACHMENT C



SITE MAP

Dublin TCE Site
Bucks County, PA
September 15, 1986

100 - Street Number

Middle Road 150 - 2.0ppb
152 150ppb

AR400058

137 S. Main 105ppb
163 S. Main N.D.

N.D. non detectable
limit 1.0 ppb

D. Reagent Blank Summary (Form IV)

This form is used to report the concentrations of both HSL and non-HSL compounds detected in the laboratory reagent blank(s).

The laboratory should complete all the header information including Laboratory name, Case number, contract number, sample matrix and concentration level. Since the protocol requires a reagent blank for each sample matrix (water or soil) and concentration level (low or medium soil), the laboratory must ensure the proper number of reagent blank summaries are included.

The laboratory should list compounds (HSL or non-HSL) by order of fractions: VOA, BNA, Pesticide. Since a VOA blank is required each 12 hours volatile analysis is performed, compounds should be separated as Method Blank 1, Method Blank 2, etc. The laboratory should only report pesticides/PCBs detected in the reagent blank that meet the identification criteria (second column confirmation) specified in Exhibit E.

The laboratory should complete the columns for concentration, contract required detection limits (where applicable) and CAS number. Tentatively identified compounds (TIC) reported, must follow the identification criteria outlined in (Exhibit D). Compound spectra that fail the qualitative identification criteria must be labeled as "unknown".

Sample concentration data are to be reported uncorrected for blank values. The laboratory must ensure that the proper number of reagent blank analyses are performed. EPA data evaluators and/or data auditors will perform blank corrections on an as needed basis.

APPENDIX III

SOIL GAS SAMPLING TECHNIQUES[1]

[1] Phil Hunt,Environmental Scientist,Roy F. Weston,Inc., Region XII TAT

ABSTRACT - SOIL GAS SAMPLING TECHNIQUES

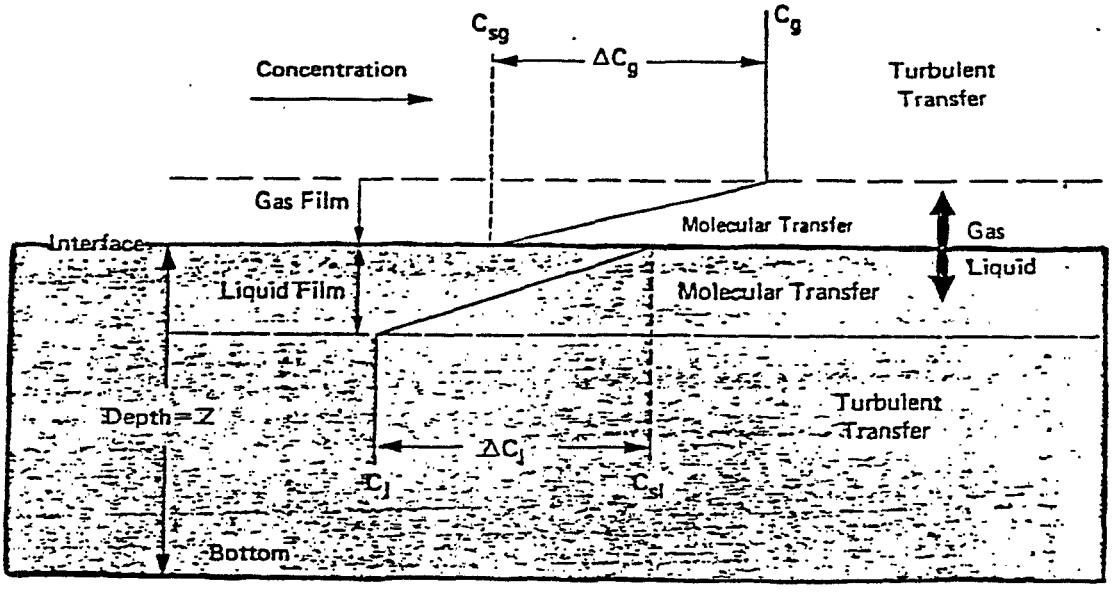
The measurement of soil gas provides a simple technique for rapidly assessing volatile organic contamination in soil and groundwater.

Soil gas measurement is based on the idea that volatile compounds in the groundwater or soil will volatilize into the airspace of the soil at concentrations that are related to the concentrations in the groundwater or soil. The soil vapor can be sampled by pulling a vacuum at a depth in the soil.

The current system employed by the EPA/ERT and ERT/TAT uses a 5/8 inch steel slambar to create a hole up to five feet deep. A 1/8 inch I.D. stainless steel tube is inserted in the hole and sealed at the surface with soil. A vacuum is drawn on the tube with a direct reading instrument for volatile organics and an initial reading recorded. A grab sample is then drawn into a Tedlar bag by drawing a vacuum around the bag with a portable air sampling pump. The grab sample is then analyzed in the field using a portable gas chromatograph to provide tentative concentration distribution of compounds and to prioritize samples for laboratory analysis. The grab samples are preserved on Tenax tubes in the field or laboratory, and analyzed by thermal desorption cryogenic trapping gas chromatograph/mass spectrometry (GC/MS).

This system employs increasing levels of analysis and quality control to provide for both rapid field assessment and detailed analysis of site contamination and plume spread.

This system has been employed successfully by the EPA/ERT and ERT/TAT at a number of sites. This measurement of soil gas has some drawbacks in soil and groundwater assessment that result from a variety of soil and groundwater conditions. Three case studies will be presented which highlight the success and failure of soil gas in contamination assessment.



Source: Liss and Slater [9]. *(Reprinted with permission from Macmillan Journals Ltd.)*

FIGURE 15—1 Two-Layer Model of Gas-Liquid Interface

CALCULATION OF SOIL CONCENTRATION FROM SOIL GAS CONCENTRATION

$$\text{Soil Water Concentration } \frac{ug}{l} = \frac{\text{Soil Gas Conc. } \frac{ul}{l} \times \text{MW } \frac{ug}{uMol.}}{\text{Henry's Law Constant } \frac{atm - m^3}{Mol.} \times \text{Molar Volume } \frac{Mol.}{atm - m^3}}$$

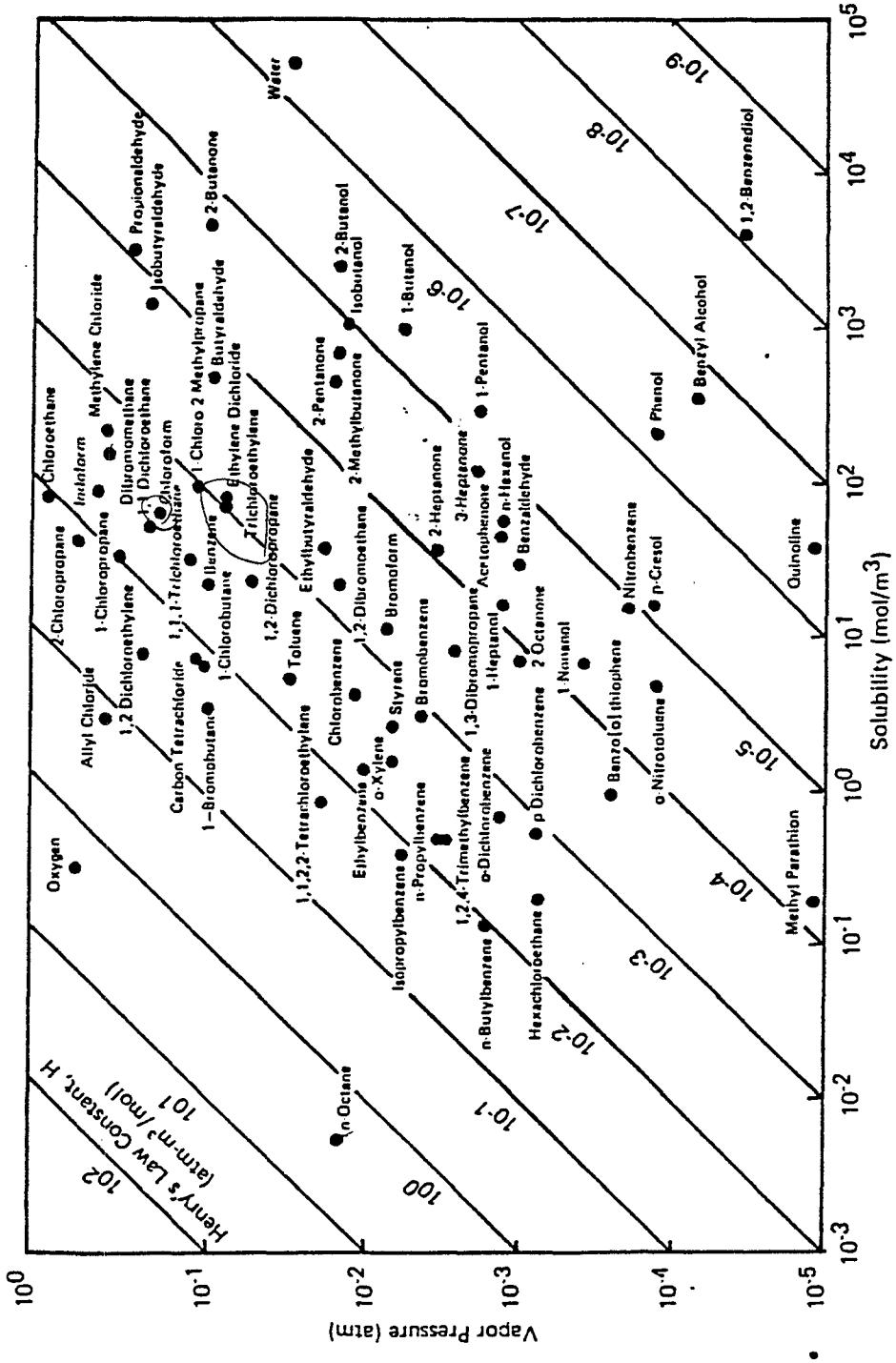
$$\text{Soil Concentration} = \text{Soil Water Concentration } \frac{ug}{l} \times \frac{\text{Volume Water (l)}}{\text{Weight of Soil (kg)}}$$

Example Calculation

Given 10 ppm of toluene in soil gas:

$$\text{Soil Water Concentration} = \frac{10 \frac{ul}{l} \text{ (ppm)} \times \frac{92 \frac{ug}{uMol.}}{24.4 \frac{ul}{uMol.}}}{6.6 \times 10^{-3} \frac{atm - m^3}{Mol.} \times 41.6 \frac{Mol.}{atm - m^3}}$$

$$\text{Soil Water Concentration} = 137 \frac{ug}{l} \text{ (ppb)}$$

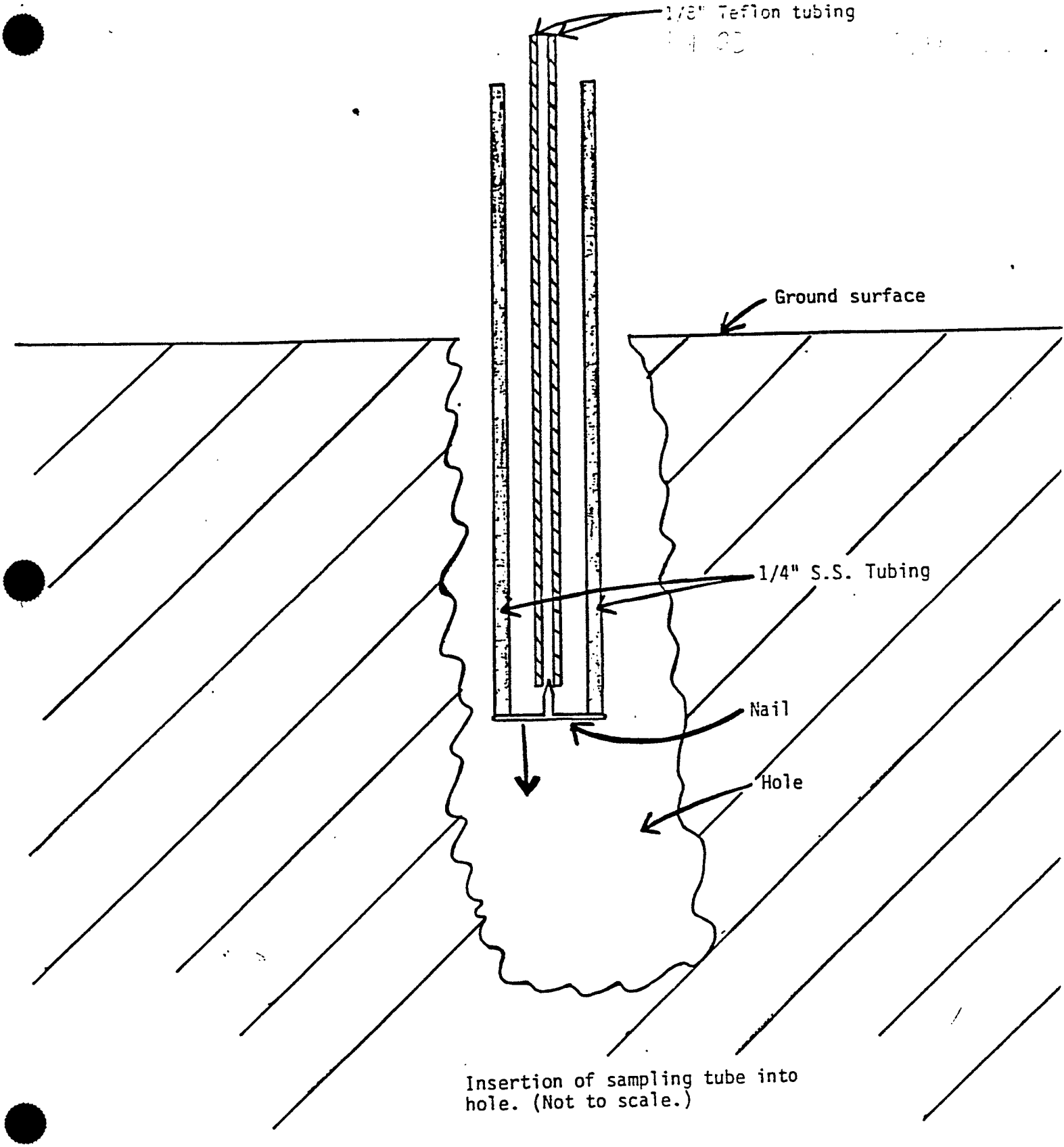


Source: Mackay and Yuen [15]. *(Reprinted with permission from the authors.)*

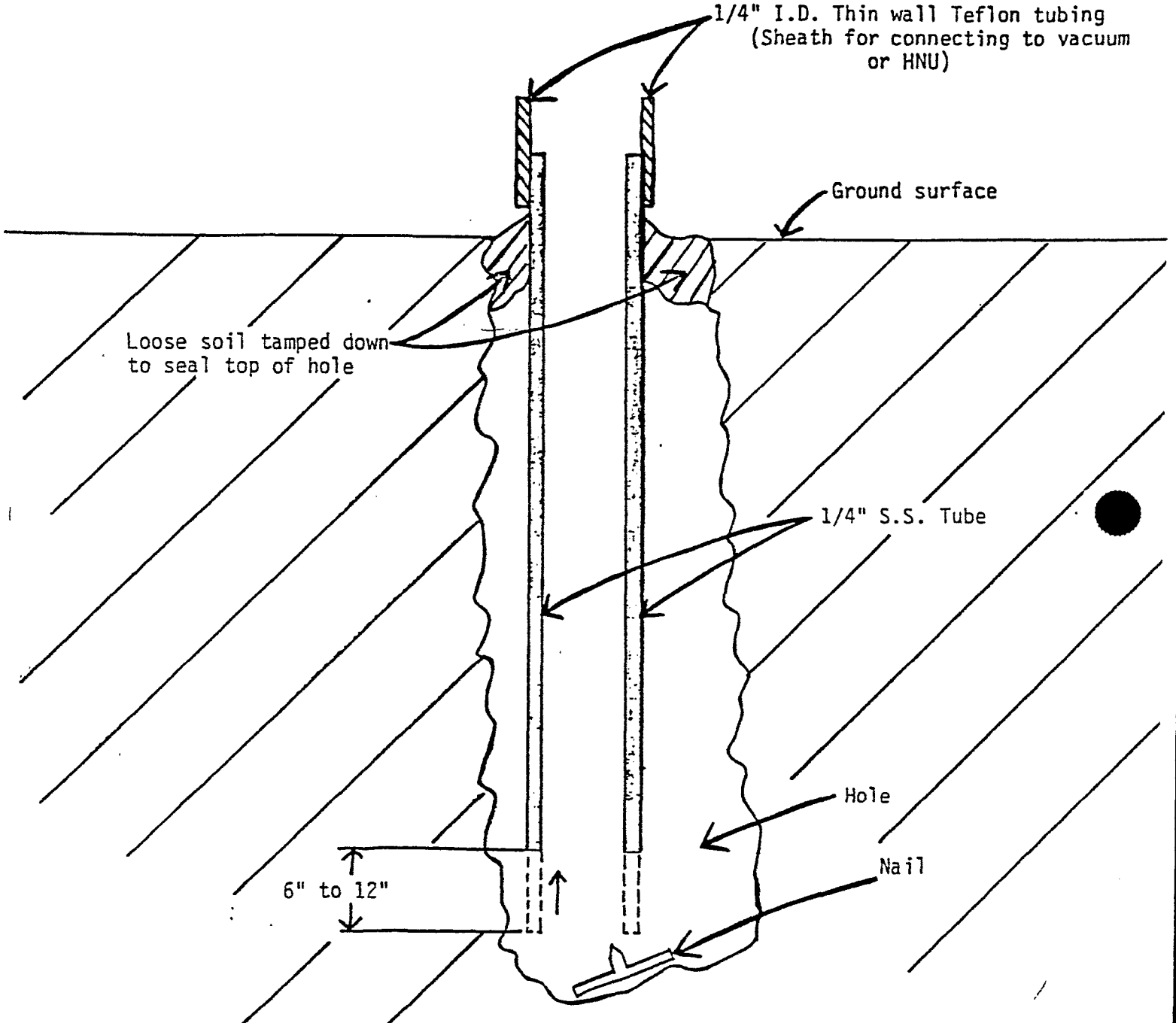
FIGURE 15–2 Solubility, Vapor Pressure and Henry's Law Constant for Selected Chemicals

SOIL GAS AND SOIL WATER
CONCENTRATIONS FOR SELECTED COMPOUNDS

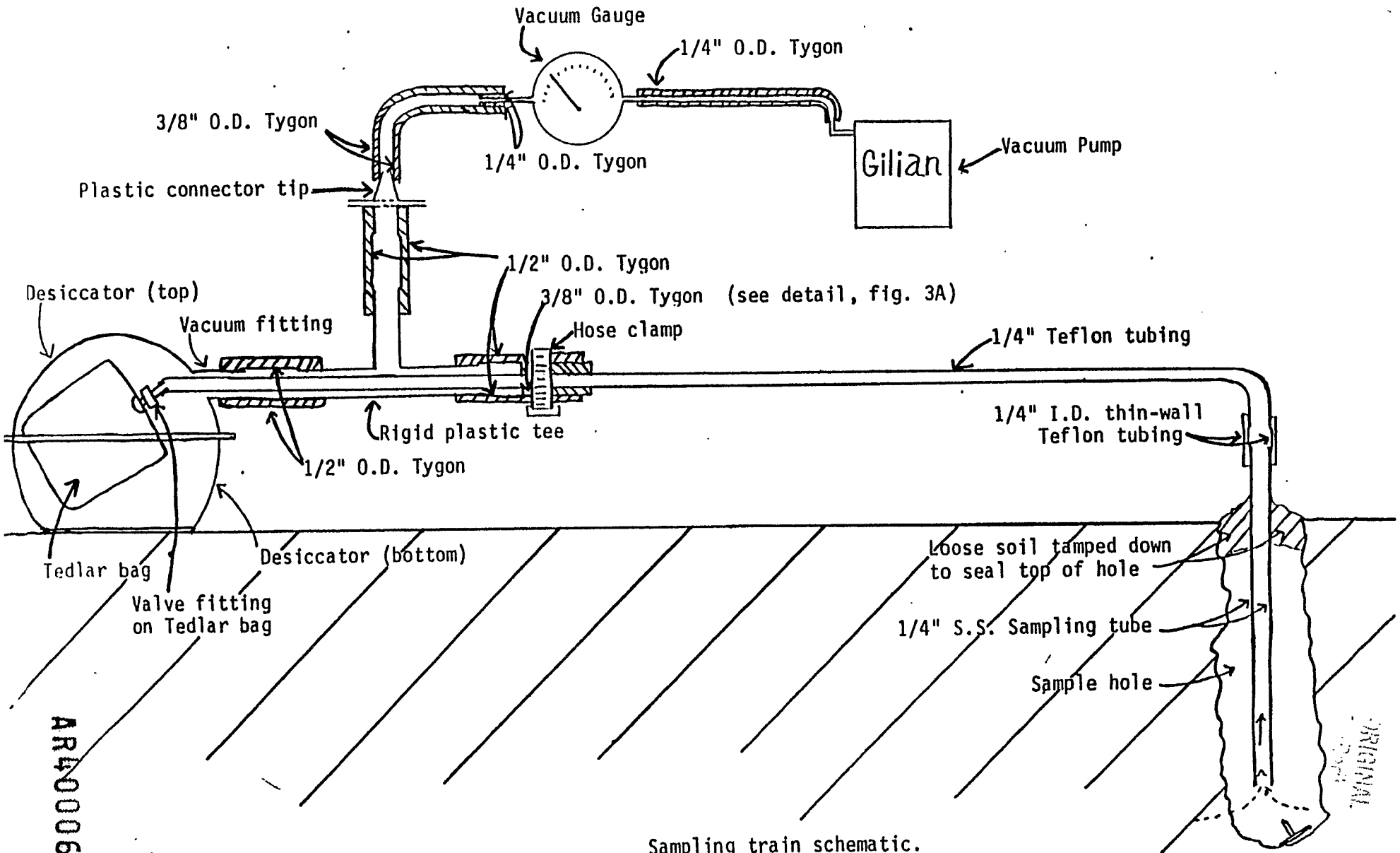
COMPOUND	AIR CONCENTRATION (ppb v/v)	SOIL WATER CONCENTRATION (ppb/w/w)
Toluene	100	1.4
Benzene	100	1.3
Ethyl Benzene	100	1.6
Xylenes	100	1.7
Trichloroethene	100	1.1
Tetrachloroethene	100	0.6
Methyl Ethyl Ketone (2-Butanone)	100	350.0
Methyl Isobutyl Ketone (2-Pentanone)	100	170.0
1-Butanol	100	1,041.0
Phenol	100	12,000.0



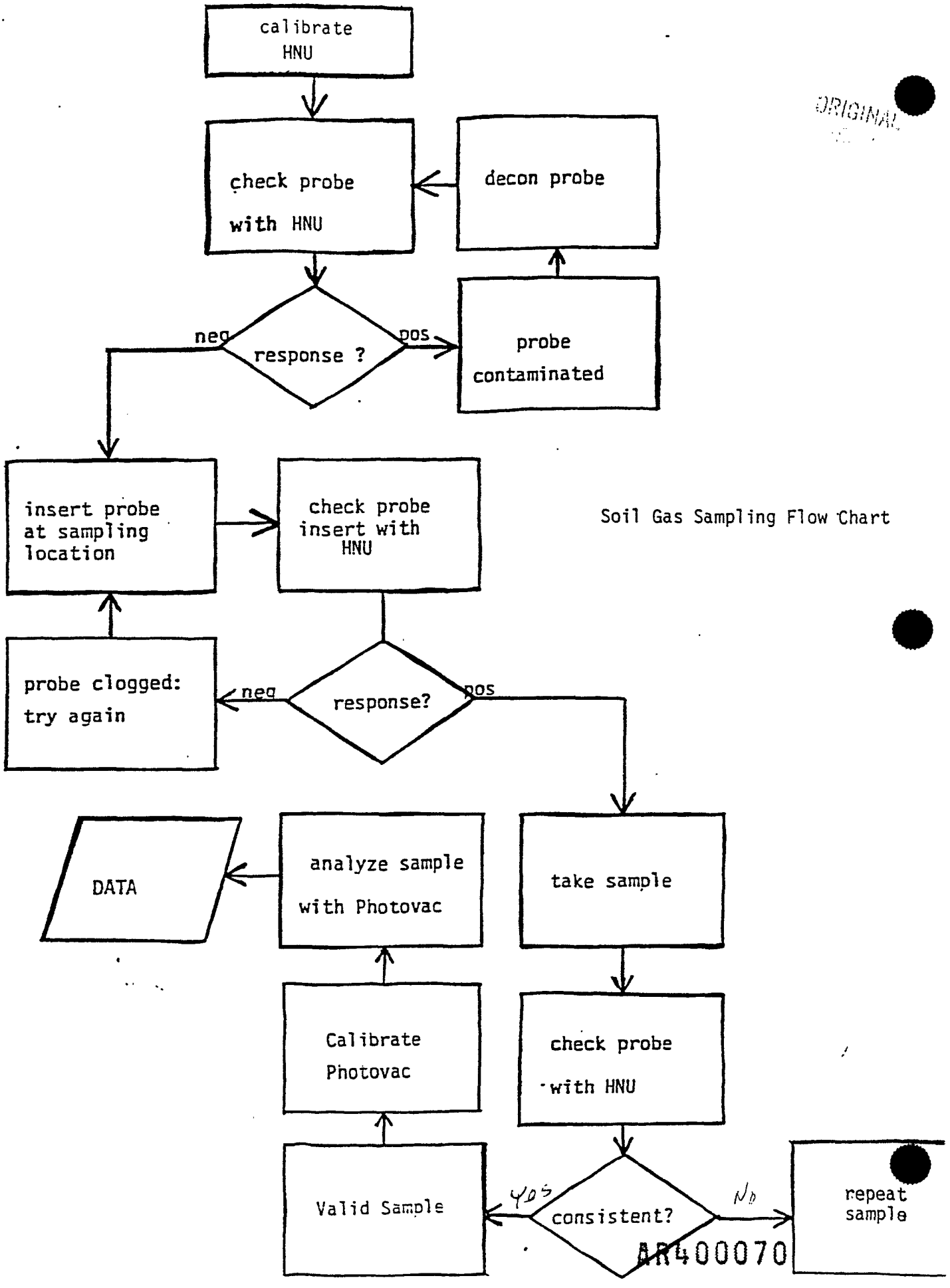
Insertion of sampling tube into hole. (Not to scale.)



Position of sampling tube
prior to sampling (after removal of
1/8" Teflon insert). (Not to scale.)



Sampling train schematic.
(Not to scale.)



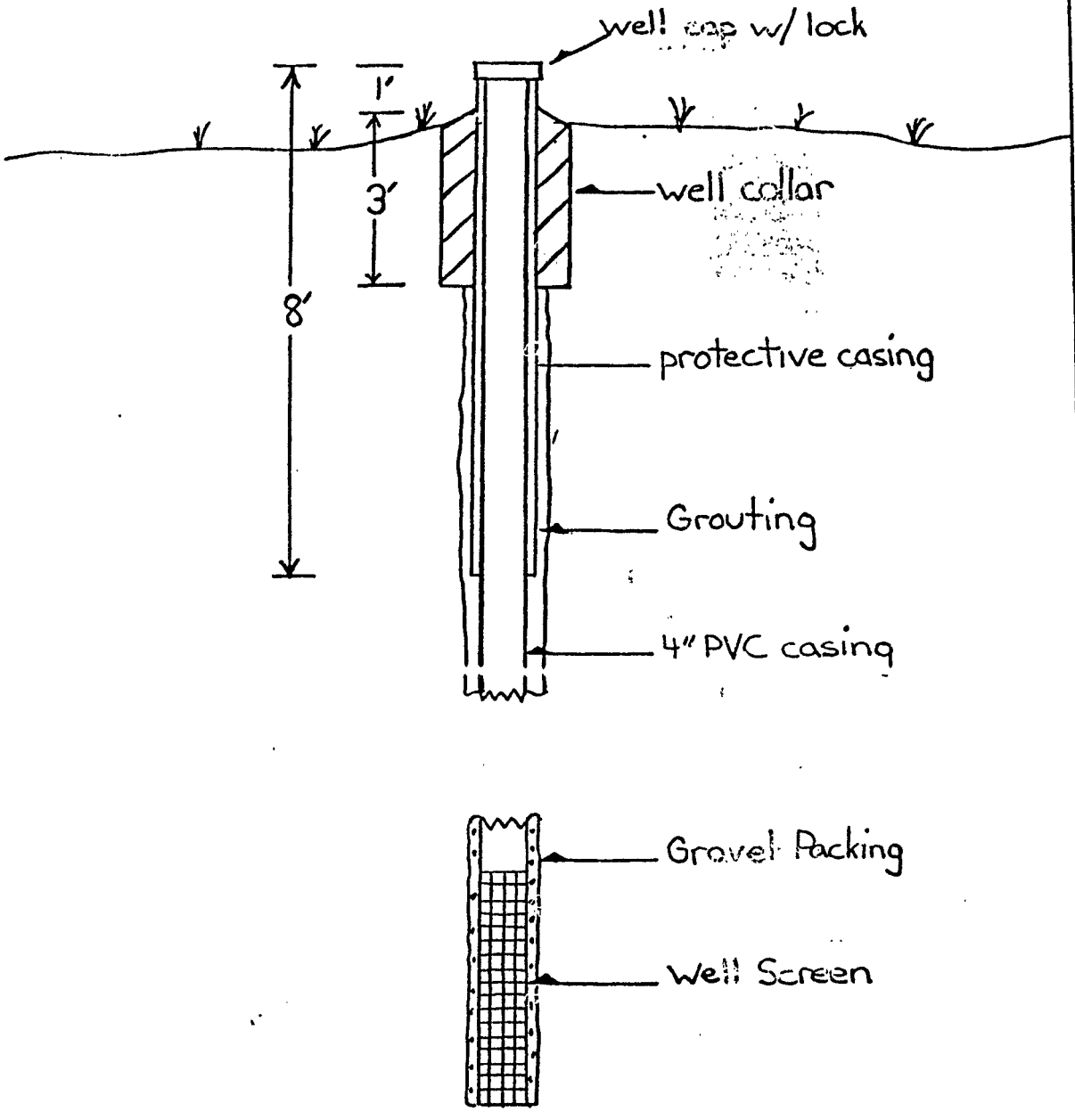
Soil Gas Sampling Flow Chart

ORIGINAL

WESTON·SPER

TTD Number:

PCS Number:



WELL DIAGRAM

DUBLIN TCE SITE
Dublin, Bucks County, PA

TCE Contamination
Dublin, Bucks County, PA

8/18/86

Resident Mrs. B. Boyle

Address 115 N Main Street
Dublin, PA

Phone (215) 249-0740

Well Water	Yes ✓	No
Public Water	Yes	No ✓
Treatment	Yes	No

No longer use well water as drinking water from when ... Buy water at store

Type No treatment system, planning to purchase a carbon filter system

Installation Date

SAMPLING

TCE Level	Sampler	Date

Comments

Originator

AR400072

WESTON
DESIGNERS CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT ______________________ W.O. NO. ____________

TASK DESCRIPTION ______________________ TASK NO. ____________

PREPARED BY ____	DEPT ____	DATE ____	APPROVED BY
MATH CHECK BY ____	DEPT ____	DATE ____	
METHOD REV. BY ____	DEPT ____	DATE ____	DEPT ____ DATE ____

TCE Contamination
Dublin, Bucks County, PA

?/ 8/86

Resident Whistlewood Apts → Apt 107
Address ______________________

Phone (215) 249-9347

Bottled for drinking water - [illegible]

[illegible]

Well water Yes ✓ No ____

Public water Yes ____ No ✓

Treatment Yes ____ No ____

[illegible]

type [illegible]
[illegible]

installation date __/__/__

Sampling
TCE level sampler Date

Comments [illegible]
TCE in well water.

AR400073

RFW 10-05-003/A-5/85

Originator ______

WESTON
DESIGNERS CONSULTANTS

SHEET ___ of ___

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____ | APPROVED BY

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____ | DEPT _____ DATE _____

1/15/86

TCE Contamination
Dublin, Bucks County, PA

Resident H. Robert Rufe
Address Main Street
Dublin PA

4/9/86
N A. 1115

Phone (215) 249-3468

Well water Yes ___ No ___

Public water Yes ___ No ___

Treatment Yes ___ No ___

type _____

installation date ___/___

Sampling TCE level sampler Date

Comments

AR400074

RFW 10-05-003/A-5/85

Originator _____

TCE Contamination
Dublin, Bucks County, PA

9/5/86

Resident Dublin Fast Tog & Notary

Address
105 North Main
Dublin PA
(215)249-3278

Phone (215)249-3278

Ed Conner

Well Water Yes ✓ (most likely) No ___

Public Water Yes ___ No ✓

Treatment Yes ✓ No ___

Type [illegible] charcoal filter system.

Installation Date about 2 weeks ago [illegible]

SAMPLING

TCE Level	Sampler	Date

Comments ______

Originator ______

AR400075

WESTON
DESIGNERS CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT ____ W.O. NO. ____

TASK DESCRIPTION ____ TASK NO. ____

PREPARED BY ____ DEPT ____ DATE ____

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY

DEPT ____ DATE ____

TCE Contamination
Dublin, Bucks County, PA

#1 & 186
9/9/86 1125

Resident Dublin Diner (215) 249-3686 Jack Evans
Address N. Main Street
Dublin PA

Phone (215) 249-3686

Well water Yes ✓ No ____

Public water Yes ____ No ✓

Treatment Yes ✓ No ____

type Charcoal treatment system $1,500
2 charcoal filters in series

installation date 1/1
Pete Noll

Separate well for diner
Water for drinking and
if clientele asks.

Board of Health
Pete Noll

5,000 ppb across street

Sampling TCE level sampler Date

55 gallons/minute

120 gallon retention tank - chlorine treatment

Cored well down 60 feet

Mr. Evans - Most casings only go down 20 feet in this area

Scott Laboratories - purchase charcoal filters 4½' high, 1' diameter

Comments Quality Labs check water each month
Aqua Pure Labs does work - Board of Health
in Quakerstown gets copy - Ed Powell
Copy to Pete Noll

AR400076

RFW 10-05-003/A-5/85

Originator ____

WESTON
DESIGNERS CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY

DEPT _____ DATE _____

TCE Contamination
Dublin, Bucks County, PA

9/8/86

Resident Emico Inc. (215) 249-9330
Address 123 N. Main St
Doylestown, PA

No one available
Call tomorrow 9/9
Ken Gorski

Phone (215) 249-9330

Called 9/9/86
Try again 1300 or 1400

Well water Yes ____ No ____

Public water Yes ____ No ____

Treatment Yes ____ No ____

type _____

installation date ____/____/____

Sampling TCE level sampler Date

Comments

AR400077

RFW 10-05-003/A-5/85

Originator _____

WESTON
DESIGNERS CONSULTANTS

SHEET ___ of ___

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____	DEPT _____	DATE _____	APPROVED BY	
MATH CHECK BY _____	DEPT _____	DATE _____		
METHOD REV. BY _____	DEPT _____	DATE _____	DEPT _____	DATE _____

TCE Contamination
Dublin, Bucks County, PA

1/ /86

Resident Myers (Clara)
Address 126 N Main Street
Dublin, PA

Phone (215) 249-3694

Called again
1140 She stated that she is not interested?? in response to my question about where she had heard the town was going to supply water in the future

Well water Yes ✓ No ___

Public water Yes ___ No ✓

Treatment Yes ___ No ✓

type [illegible]

installation date ___/___

Sampling TCE level sampler Date

Comments [illegible]

AR400078

RFW 10-05-003/A-5/85

Originator ___

WESTON
DESIGNERS CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT ____ W.O. NO. ____
TASK DESCRIPTION ____ TASK NO. ____
PREPARED BY ____ DEPT ____ DATE ____
MATH CHECK BY ____ DEPT ____ DATE ____
METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY ____
DEPT ____ DATE ____

TCE Contamination
Dublin, Bucks County, PA

9/8/86
Busy 1515

Branch office Resident Doylestown Federal Savings & Loan (215) 348-9021
Address 174 ~~173~~ N. Main Street
~~Doylestown, PA~~
Dublin, PA

Barbara Rowley
Operations officer
Bank closes at 1700

Phone (215) 348-9021

9/9/86 Spoke to Barbara Rowley

Well water Yes ✓ No ____

Public water Yes ____ No ✓

Treatment Yes ____ No ✓

Not aware of any treatment system

type Culligan - softening water

installation date __/__/__

Sampling
TCE level ____ sampler ____ Date ____

Comments ____

AR400079

RFW 10-05-003/A-5/85

Originator ____

WESTON
DESIGNERS CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____ | APPROVED BY

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____ | DEPT _____ DATE _____

TCE Contamination
Dublin, Bucks County, PA

1 186

Resident Farm Bureau (215) 249-3541
Address 104 Mill Street
Dublin, PA

Phone (215) 249-3541

Well water Yes ✓ No ____

Public water Yes ____ No ✓

Treatment Yes ____ No ____

type ____

installation date 5/12/85

Sampling TCE level sampler Date

Comments

AR400080

RFW 10-05-003/A-5/85

Originator ____

WESTON
DESIGNERS CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT ____ W.O. NO. ____

TASK DESCRIPTION ____ TASK NO. ____

PREPARED BY ____ DEPT ____ DATE ____

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY ____ DEPT ____ DATE ____

TCE Contamination
Dublin, Bucks County, PA

? / ? /86

Resident Bucks County Bank
Address Cherry
145 N Main Street
Dublin, PA

Phone (215) 249-3524

Well water Yes ____ No ____

Public water Yes ____ No ____

Treatment Yes ____ No ____

type ____

installation date __/__/__

Sampling
TCE level sampler Date

Comments ____

AR400081

RFW 10-05-003/A-5/85

Originator ____

WESTON
DESIGNERS CONSULTANTS

SHEET ___ of ___

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____ | APPROVED BY

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____ | DEPT _____ DATE _____

TCE Contamination
Dublin, Bucks County, PA

1/86

Resident Moyers Flower Shop
Address 138 N. Main Street
Dublin, PA

Phone (215) 249-3530

Well water Yes ✓ No ____

Public water Yes ____ No ____

Treatment Yes ____ No ____

type _____

installation date ____/____

Sampling
TCE level sampler Date

Comments _____

AR400082

RFW 10-05-003/A-5/85

Originator _____

TCE Contamination
Dublin, Bucks County, PA

9 / 8 /86

[illegible]

Resident ____________________

Address Mrs Moyers
Elephant Rd

(215) 249-3180

Phone ____________________

Well Water Yes ✓ No ____

Public Water Yes ____ No ____

Treatment Yes ____ No ____

[illegible]

Type These are the same Moyers [illegible]

Installation Date ____________________

SAMPLING

TCE Level	Sampler	Date

Comments ____________________

Originator ____________________

AR400083

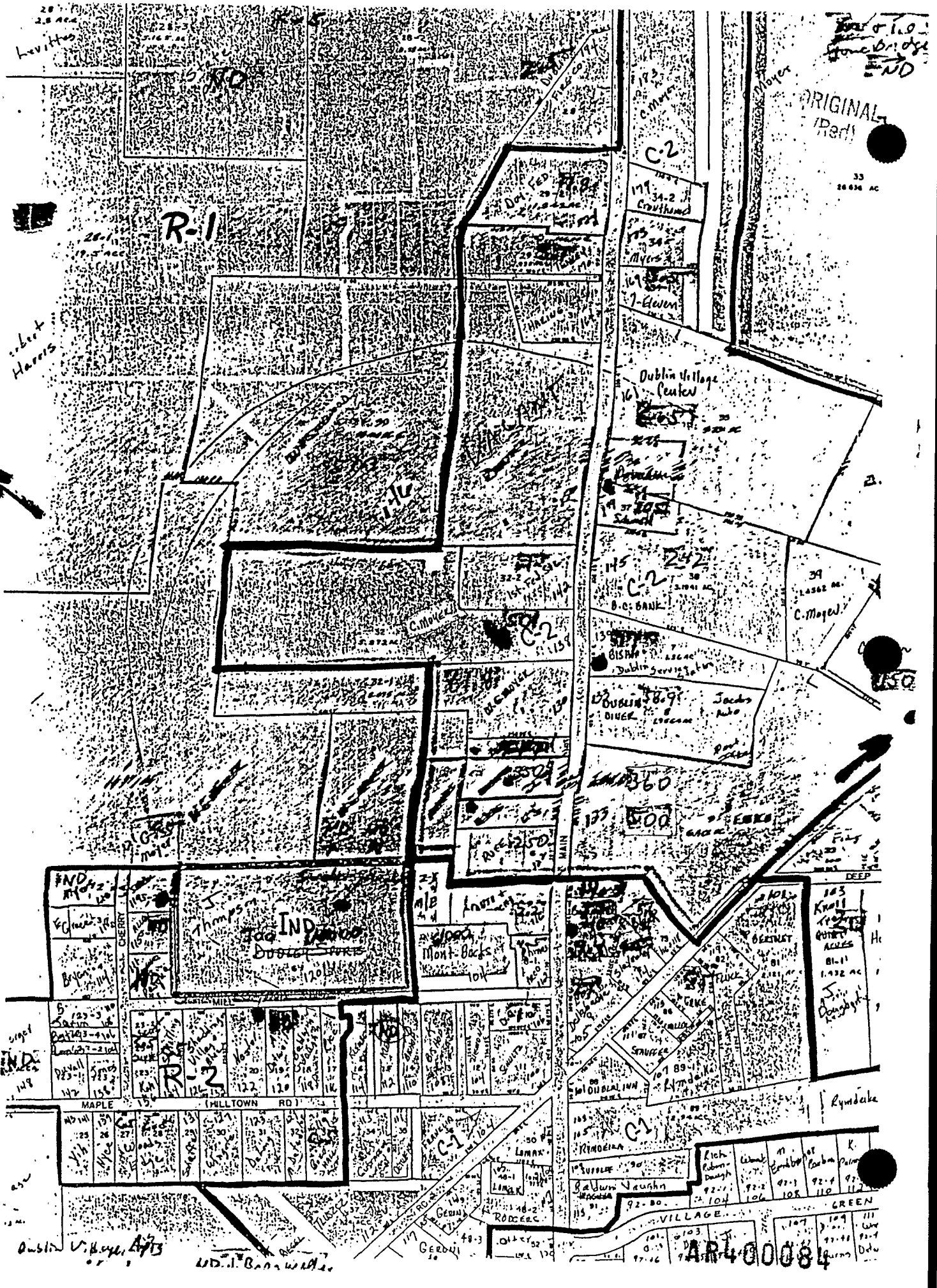

ORIGINAL
(Red)
R-1
R-2
C-2
C-1
IND
Dublin Village Center
MAPLE
(HILLTOWN RD)
MAIN
DEEP
GREEN
VILLAGE
AR400084

TABLE I

TCE CONCENTRATIONS AND HEALTH ENDPOINTS OF CONCERN
DUBLIN, PENNSYLVANIA

Let X = TCE level in well.

TCE CONCENTRATION (ug/L or ppb)	HEALTH ENDPOINT OF CONCERN	ESTIMATED LENGTH OF EXPOSURE TO ACHIEVE ENDPOINT OF CONCERN	
		Time	Upper Bound Estimate of Cancer Risk*
X < 5	Probably None		
X = 5	Cancer	20 yr	1×10^{-6}
X = 50	Cancer	2 yr	1×10^{-6}
X = 130	Cancer Chronic toxicity	70 yr 50 yr	1×10^{-4}
X = 260	Cancer Chronic toxicity	35 yr 25 yr	1×10^{-4}
X = 2000	Cancer Chronic toxicity	4 yr 3 yr	1×10^{-4}

* Based upon an estimated upper 95 percent confidence limit of the carcinogenic potency of TCE.

Let yr = year, mo = month, wk = week, and TCE = trichloroethylene.

Estimates include exposure from 3 pathways of concern (i.e., ingestion, inhalation, and dermal absorption from well water). The table assumes no previous exposure or other routes of exposure.

TABLE II

ESTIMATED TIME OF EXPOSURE TO ACHIEVE HEALTH ENDPOINT OF CONCERN
DUBLIN, PENNSYLVANIA

X = TCE level in well.

TCE CONCENTRATION (ug/L or ppb)	ESTIMATED TIME OF EXPOSURE TO ACHIEVE ENDPOINT OF CONCERN		
		Upper Bound Estimate of Excess Lifetime Cancer Risk	
	Chronic Toxicity	10^{-6}	10^{-4}
5 = X	>70 yr	20 yr	>70 yr
5 < X < 50	>70 yr	2 yr	>70 yr
50 < X < 130	50 yr	8 mo	70 yr
130 < X < 260	25 yr	4 mo	35 yr
260 < X < 2000	3 yr	2 wk	4 yr

Let yr = year, mo = month, wk = week, and TCE = trichloroethylene.

Estimates are based upon the addition of exposure from three pathways of concern (i.e., drinking, bathing, and showering), correspond to the higher TCE level for each concentration range, and assume no previous exposure or other routes of exposure.

TABLE III

SUGGESTED TIME FRAME TO IMPLEMENT ACTION TO PROTECT HEALTH
AND MONITOR TAP WATER FOR ALL USES
DUBLIN, PENNSYLVANIA

Let X = TCE Level in well.

TCE CONCENTRATION (ug/L or ppb)	ACTION RECOMMENDED TO REDUCE EXPOSURE	WITHIN	MONITORING FREQUENCY	WATER USES
5 > X	NO	-	semi-annual	all
5 < X < 50	YES	2 yr	semi-annual	all
50 < X < 130	YES	8 mo	quarterly	all
130 < X < 260	YES	4 mo	monthly	all
260 < X < 2000	YES	immed	weekly	all
2000 < X	YES	immed	verify	all

Let yr = year, mo = month, wk = week, and TCE = trichloroethylene.

The above table presents a suggested time frame to implement protective measures in order to protect public health from both chronic toxicity and an excess lifetime cancer risk (1×10^{-6}) due to multiple pathways (i.e., drinking, bathing, and showering). Note that the above table assumes no previous exposure or other routes of exposure. The time-frame for implementing actions to protect public health and/or to monitor tap water would also be dependent upon the length of previous exposure, current exposure, the status of the groundwater contamination plume, or continued use of the groundwater resources for drinking, cooking, bathing, or showering.

REFERENCES

1. EPA, Office of Drinking Water, Draft Health Advisory for Trichloroethylene, September 30, 1985.

2. Brown, Halina Szinwald, Ph.D., Bishop, Donna R., M.P.H., Rowan, Carol A., M.S.P.H., "The Role of Skin Absorption as a Route of Exposure for Volatile Organic Compounds (VOCs) in Drinking Water," American Journal of Public Health, Vol. 74, No. 5, May 1984.

3. EPA, Draft Superfund Public Health Evaluation Manual, December 18, 1985.

4. EPA, Office of Water Planning and Standards, Water-related Environmental Fate of 129 Priority Pollutants, Volume 2, EPA-440/4-79-029b, December 1979.

5. EPA, Office of Toxics Integration, Office of Pesticides and Toxic Substances, Intermedia Priority Pollutant Guidance Documents, July 1982.

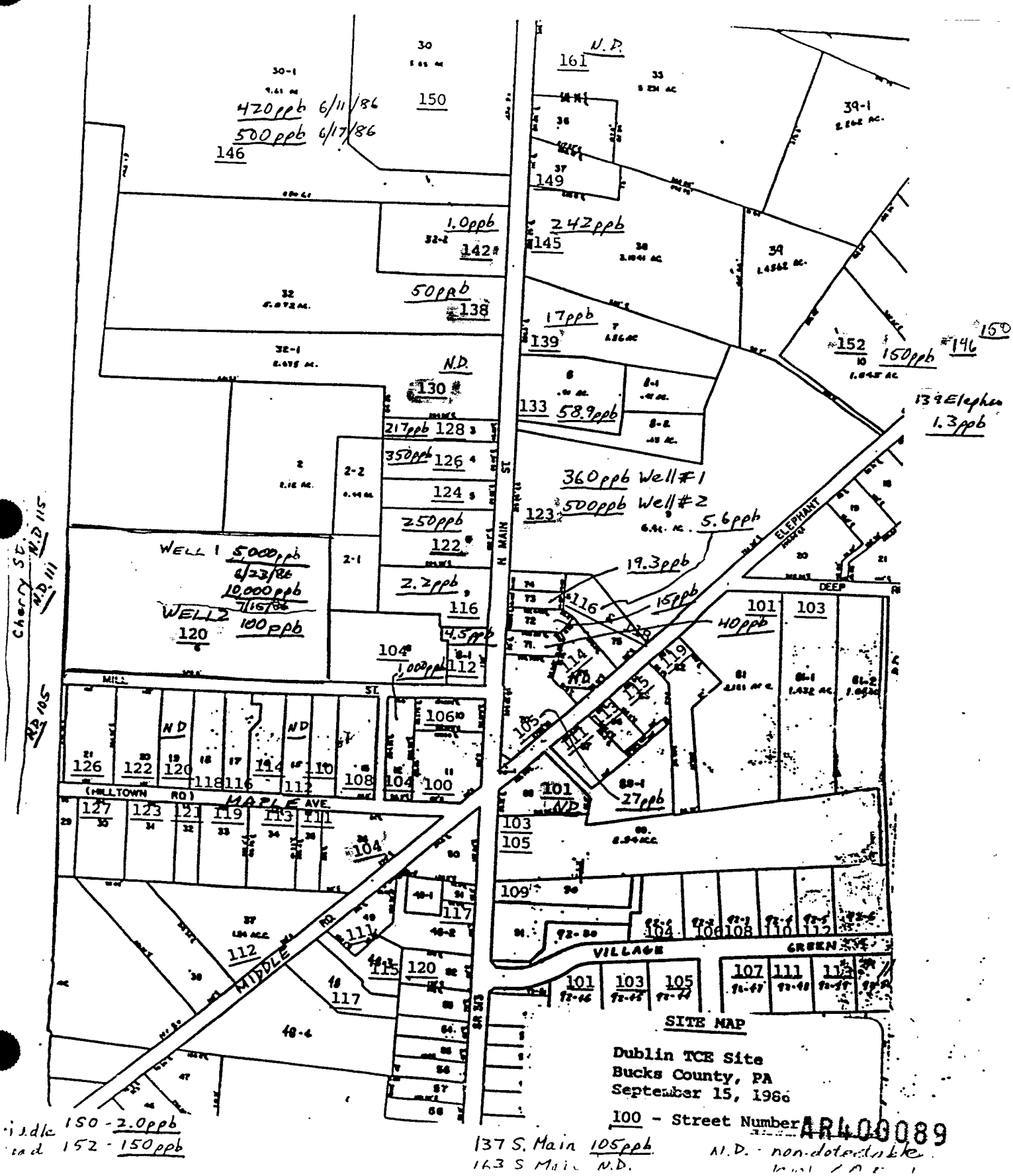
6. Love, Jr., O. Thomas, and Eilers, Richard G., Treatment of Drinking Water Contamining Trichloroethylene and Related Industrial Solvents, Journal American Water Works Association, August 1982.

(TCE levels are underlined)

2.5ppb 177 N Main
7.8ppb 174 N. Main
3.7ppb 176 N. Main

60

ATTACHMENT C



Middle 150 - 2.0ppb
and 152 - 150ppb

137 S. Main 105ppb
163 S Main N.D.

N.D. - non-detectable

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